

REMARKS

Applicants gratefully acknowledge the allowance of claims 1-14, 51-54, 56-58, 61-63, 86-89, 92-95, 98-101, 104-106, 109-112, 128, 129, 133, 142, 143, 149, 154-157 and 159.

Election/Restrictions

The examiner withdrew claim 158 from further consideration, stating that claim 158 depends from claim 76, which was withdrawn from consideration as directed to a non-elected invention.

Response

Claim 76 depends from claim 2, which has been allowed. Applicant respectfully requests allowance of all claims to additional species which are written in dependent form or otherwise include all of the limitations of the allowed generic claims, under 37 C.F.R. 1.141. The claims at issue include, but are not necessarily limited to dependent claims 27-32, 39-50, 76-85, 113-124, and claim 158. These claims either depend from allowed claims, or depend from claims which are allowable for the following reasons.

Specification

The specification, including the paragraph starting at page 8, line 22, has been amended.

Claim Rejections - 35 USC §112, second paragraph

1. Claims 66-75, 130, 131, 135-140, 144-147, 150 and 151 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and

distinctly claim the subject matter which applicant regards as the invention. Specifically, the examiner states that, by definition, an alkenyl contains at least two carbon atoms.

Response

Claims 66-70 have been amended in a manner which is believed to render the claims definite. Applicants respectfully request allowance of claims 66-75, 130, 131, 135-140, 144-147, 150 and 151.

2. Claims 15-20, 55, 59, 60, 64, 65, 69, 70, 74, 75, 90, 91, 96, 97, 102, 103, 107, 108, 131, 136, 138, 140, 147, and 151 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the examiner states that it is unclear in claims 15-20 as to what "complexed fraction" of hydroxyl groups constitutes and how it differs from an "uncomplexed fraction" of hydroxyl groups. Also, the examiner states that "complexed portion" of claims 17-18 has no clear antecedent basis.

Response

Claims 17-18 have been amended to refer to "complexed fraction" which finds antecedent basis in claim 15.

All of the rejected claims are definite under 35 U.S.C. § 112 because the claims define the patentable subject matter with a reasonable degree of particularity and distinctness.

See MPEP 2173.02

The primary purpose of the requirement for claim definiteness is

to ensure that the scope of the claims is clear so the public is informed of the boundaries of what constitutes infringement of the patent. A secondary purpose is to provide a clear measure of what the applicant regards as the invention so that it can be determined whether the claimed invention meets all the criteria for patentability and

whether the specification meets the criteria of 35 U.S.C. § 112, first paragraph with respect to the claimed invention.

MPEP 2173.

The examiner's focus during examination of the claims for compliance with the requirement of definiteness under 35 U.S.C. § 112, second paragraph is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. MPEP 2173.02. "When the examiner is satisfied that patentable subject matter is disclosed, and it is apparent to the examiner that the claims are directed to such patentable subject matter, he or she should allow claims which define the patentable subject matter with a reasonable degree of particularity and distinctness." *Id.*, emphasis in original. In the present case, "one skilled in the art would understand all language in the claims when read in light of the specification, as the claims must be." *Rosemount, Inc. v. Beckman Instruments, Inc.*, 221 U.S.P.Q. 1, 7 (Fed. Cir. 1984), citing *Caterpillar Tractor Co. v. Berco, S.P.A.*, 219 U.S.P.Q. 185 (Fed. Cir. 1983).

As explained in the specification:

[t]he present invention maximizes the "complexed fraction" of the total quantity of surface hydroxyl groups, or the **fraction of the total quantity of surface hydroxyl groups that are functionalized**. The present invention recognizes tht the surface hydroxyl groups on metal oxide particles have different 'accessibilities,' and therefore have different reactivities towards gropus with different steric hindrances.

Specification, page 3, lines 5-9 (emphasis added). What it means to "functionalize" the hydroxyl groups, and characteristics of the "functionalities" used to "functionalize" the hydroxyl groups is discussed at length in the specification. A summary, from p. 3, l. 10-p. 4, l. 7 of the specification, is reproduced below for the examiner's convenience:

The present invention recognizes that the surface hydroxyl groups on metal oxide particles have different "accessibilities," and therefore have different reactivities towards groups with different steric hindrances.

For purposes of the present invention, functionalities with a "low steric hindrance" are defined as functionalities having a formula weight of less than about 250 grams/mole, preferably about 150 grams/mole or less. Functionalities with a "high steric hindrance" are defined as functionalities having a formula weight of about 250 grams/mole or more, preferably of about 300 g/mole or more.

Hydroxyl groups that are accessible to and complex with functionalities having a variety of both high steric hindrances and low steric hindrances are herein defined as "reactive groups." Hydroxyl groups that are accessible only to functionalities having low steric hindrance are herein defined as "less reactive groups."

Suitable agents with high steric hindrance include, but are not necessarily limited to organofunctional coupling agents, defined in more detail below. Suitable agents with less steric hindrance include, but are not necessarily limited to adhesion promoters, preferably mobile adhesion promoters, defined in more detail below. A preferred embodiment of the invention functionalizes the surface hydroxyl groups of metal oxide particles with a combination of both organofunctional coupling agents and adhesion promoters. Using functionalities with differing steric hindrances maximizes the fraction of the total quantity of the surface hydroxyl groups functionalized, rendering the surface of the metal oxide particle less protic and more hydrophobic. In a preferred embodiment, substantially all of the hydroxyl groups are functionalized.

In a preferred embodiment, the metal oxide particles are zirconium oxide particles, the mobile adhesion promoters are silanes, and the organofunctional coupling agents are zirconates.

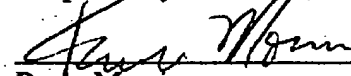
The examiner has not established that persons of ordinary skill in the art will not understand the meaning of the phrases "complexed fraction" and "uncomplexed fraction" when the claims are read in light of the specification. The claims define the patentable subject matter with a reasonable degree of particularity and distinctness, and therefore meet the threshold requirements of clarity and precision under 35 U.S.C. § 112.

Applicants respectfully request withdrawal of the rejection and allowance of claims 15-20, 55, 59, 60, 64, 65, 69, 70, 74, 75, 90, 91, 96, 97, 102, 103, 107, 108, 131, 136, 138, 140, 147, and 151.

CONCLUSION

For all of the foregoing reasons, Applicants respectfully request entry of the amendments and consideration and allowance of all of the pending claims. The Commissioner is hereby authorized to charge any fees in connection with this response, or to credit any overpayment, to Deposit Account No. 50-0997 (SwRI-2749A) maintained by Paula D. Morris & Associates, P.C.

Respectfully submitted,



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